

# Watershed Database and Mapping Projects: Decision Support Tools



**P**rotection and restoration of coastal watersheds requires the synthesis of complex environmental issues. Contaminated site remediation, dredging and disposal of contaminated sediments, and restoring injured habitats are a few of the challenges facing coastal managers. The evaluation of multiple environmental issues can be significantly improved by combining scientific data and watershed characteristics into a Geographic Information System (GIS). NOAA's Coastal Protection and Restoration Division (CPRD) has developed decision - support tools for specific watersheds that combine the use of a standard database structure, database-mapping application (Query Manager™) and GIS (i.e., Watershed Projects). Sediment contaminant and toxicity and tissue data, natural resources, and potential habitat restoration projects can be overlaid on a watershed's features and land uses, and displayed on maps at flexible spatial scales. This approach simplifies data analysis and presentation, provides valuable tools for complex decision-making, and improves our understanding of dynamic aquatic ecosystems.

NOAA has used this approach in several watersheds throughout coastal regions affected by contaminant releases from Superfund sites and other sources including Massachusetts Bay, Newark Bay, San Francisco Bay, Christina River, Sheboygan River, Alcoa/Lavaca Bay, Puget Sound, and Calcasieu Estuary. All CPRD Watershed Projects use a standard structure along with information tailored to the major objectives of each watershed. For example, the Newark Bay and Calcasieu Estuary Watershed Projects support decisions about risk assessment, remediation and disposal of contaminated sediment, while the San Francisco Bay and Christina River Watershed Projects focus on Superfund site remediation and habitat restoration. With Clean Water Initiative funding in 2000, CPRD began several more projects: Charles River, Hudson River, Anacostia River, St. Andrew Bay, Willamette River, and Kalamazoo River. These new Watershed Projects provide an integrated assessment tool to a wider range of coastal resource managers and communities, enabling improved evaluation and problem-solving for a broad spectrum of coastal issues.



The common organizational structure for data and spatial information promotes data sharing among Federal, state, local agencies and communities working within a watershed.

**NOAA's approach is to provide a rapid, convenient way** to create maps of the watershed that display analyzed, sorted, and summarized data that coastal managers have selected from a menu of programmed queries. The primary data types include sediment chemistry, sediment toxicity, and tissue chemistry data. The base maps also display geomorphology, habitat characteristics, and land-use information. Integrating remedial investigation data with recently acquired data in a single system helps investigators associate the distribution of contaminants with specific sources and evaluate the possibility of contaminant effects in potential habitat restoration areas. Combining natural resource information and contaminant distributions across the watershed enhances the potential for successful restoration of wide-ranging populations.

**The watershed projects have benefitted** a variety of user groups and have enhanced cooperation and data sharing. The database mapping system allows users to:

- Evaluate multiple data sets within a geographic area;
- Identify chemical concentration and toxicity gradients;
- Prioritize problem areas based on sediment chemistry, sediment toxicity, and/or tissue chemistry;
- Catalog and evaluate potential habitats for restoration;
- Inventory planned, ongoing and completed restoration projects;
- Identify important data gaps; and
- Add and share new information.

**Analytical tools such as database queries** and import/export scripts developed for one project can be applied to all projects because of the common database and GIS project structure. Query Manager can be used to select and export data to any program that supports standard spreadsheet, database, or tab-delimited text files. Scripts have been developed for seamless import of data from

Query Manager to ArcView® GIS to enhance and simplify further data analysis and presentation.

**The Watershed Projects run on standard desktop** Macintosh® and Microsoft Windows®-based personal computers. The database and mapping application, Query Manager is an easy-to-use, interactive system that allows you to query the database and rapidly display the results on a map in MARPLOT® or deliver the data in the appropriate form to the watershed ArcView GIS project. In addition, both standard and customized basemaps are developed in ArcView to support all Watershed Projects. Standard layers include wetlands, Superfund sites, and regulated industrial facilities and NOAA digital navigation charts. Custom imagery and other spatial data layers also are routinely used with data from the Query Manager database.

**CPRD's Watershed Projects are proving useful** throughout the Superfund remedial decision-making process, from identifying locations for the collection of additional samples to providing the historical context for interpreting data, to identifying areas for restoration. This versatile tool not only improves NOAA's ability to protect and restore the biodiversity of watersheds that contribute to healthy coastal habitats, and has the potential to help address other important environmental issues.

For additional information, call Alyce Fritz at 206/526- 6305 or George Graettinger at 206/ 526-6938 or visit our website at

**<http://response.restoration.noaa.gov/cpr/cpr.html>**

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**William M. Daley**  
Secretary, U.S. Department of Commerce

**D. James Baker, Ph.D.**  
Under Secretary of Commerce for  
Oceans and Atmosphere and  
Administrator, National Oceanic and  
Atmospheric Administration

**Scott B. Gudes**  
Assistant Secretary of Commerce for  
Oceans and Atmosphere and  
Deputy Administrator, National Oceanic and  
Atmospheric Administration (Acting)

**Nancy Foster, Ph.D.**  
Assistant Administrator for  
Ocean Services and Coastal Zone Management,  
NOAA National Ocean Service